ADDRESSING AIR QUALITY REQUIREMENTS DURING MAINTENANCE, SERVICE, REPAIR, AND DISPOSAL OF REFRIGERATION APPLIANCES/EQUIPMENT

Purpose

This Meteorology and Air Quality Group (MAQ) procedure describes the process the support services subcontractor personnel perform while maintaining, servicing, repairing, or disposing of Los Alamos National Laboratory (LANL) refrigeration appliance/equipment to meet the requirements of 40 CFR §82, Subpart F.

Scope

This procedure applies to any LANL or support services subcontractor personnel who service, maintain, repair, and/or dispose of LANL refrigeration appliance/equipment, and to MAQ personnel who enter and track refrigeration information. This procedure does not apply to maintaining, servicing, repairing or disposing of motor vehicle air conditioners or motor vehicle-like air conditioners.

In this procedure

Hazard Control Plan

RRES-MAQ personnel do not perform the non-office work steps in this procedure; thus no Hazard Control Plan has been prepared. It is the responsibility of the supervisors of the support services subcontractor personnel performing this work to ensure all applicable hazards analyses have been performed according to applicable requirements.

Signatures
(continued on next page)

Approved by:	Date:
Jean M Dewart Jean Dewart MAQ Group Leader	3/18/03

3/24/2003

CONTROLLED DOCUMENT

General information about this procedure

Signatures *(continued)*

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Attachments

This procedure has the following attachments:

Number	Attachment Title	No. of pages
1	Refrigerant Support Services Subcontractor Service Form	1
2	Evacuation Label	1
3	Refrigeration Appliance Salvage/Disposal Log	1
4	Refrigerant Cylinder Action Form	1
5	Cylinder ID Tag Sample	1
6	RRES-MAQ Support Services Subcontractor Service Order Evaluation Form	1

History of revision

This table lists the revision history and effective dates of this procedure.

Revision	Date	Description Of Changes
0	6/9/98	New document.
1	5/31/00	Incorporated procedure RRES-MAQ-313, modified text and attachments, and combined Accidental Release Form into the Maintenance, Service, Repair, and Disposal Form.
2	5/9/01	Developed new service order form and adopted new policies and processes for Title VI compliance.
3	6/28/01	Added chapter on new cylinder tag and added tag as attachment.
4	2/27/02	Modified all forms, added new form for service form evaluation, and text modified.
5	3/20/03	Modified forms and modified text.

General information, continued

Who requires training to this procedure?

The following personnel require training before implementing this procedure:

- **Refrigeration technicians** responsible for maintaining, servicing, repairing, and/or disposing of appliance/equipment containing refrigerants.
- Support services subcontractor **refrigerant compliance coordinator** (RCC)
- MAQ **refrigeration records coordinators**

The following personnel do not require training to this procedure:

- Gas Plant personnel who issue cylinder tags

Training method

The training method for this procedure is **classroom** instruction for the refrigeration technicians and **read (self-study)** for all other personnel. All training is documented in accordance with the MAQ procedure for training (RRES-MAQ-024).

Prerequisites

In addition to training to this procedure, the following certification is also required by **refrigeration technicians** prior to performing work on any refrigeration appliance/equipment:

- Appropriate EPA type certification for the equipment to be repaired. See page 7 of this procedure.

Acronyms

EPA: Environmental Protection Agency

HCFC: hydrochlorofluorocarbons

HFC: Hydrofluorocarbons

MVAC: Motor Vehicle Air Conditioner

ODS: Ozone Depleting Substances

RCC: Refrigerant Compliance Coordinator

RCRA: Resource Conservation and Recovery Act

General information, continued

Definitions specific to this procedure
(continued on next page)

Appliance/equipment: any device which contains and uses a substance as a refrigerant and which is used for household or commercial purposes, including any air conditioner, refrigerator, chiller, or freezer. EPA interprets this definition to include all air-conditioning and refrigeration appliances except those designed and used exclusively for military applications [40 CFR §82 Subpart F].

Apprentice: any person who is currently registered as an apprentice in service, maintenance, repair, or disposal of appliance/equipment with the U.S. Department of Labor's Bureau of Apprenticeship and Training (or a State Apprenticeship Council recognized by the Bureau of Apprenticeship and Training). If more than two years have elapsed since the person first registered as an apprentice with the Bureau of Apprenticeship and Training (or a State Apprenticeship Council recognized by the Bureau of Apprenticeship and Training), the person shall not be considered an apprentice.

Approved equipment testing organization: any organization which has applied for and received approval from the EPA Administrator pursuant to 40 CFR §82.160 to test recycling and recovery equipment.

Certified refrigerant recovery or recycling equipment: equipment manufactured on or after November 15, 1993 certified by an approved equipment testing organization to meet EPA's standards, equipment certified pursuant to 40 CFR §82 Subpart B, or equipment manufactured before November 15, 1993 that meets EPA's performance requirements.

Disposal: the process leading to and including:

1. The discharge, deposit, dumping or placing of any discarded appliance/equipment into or on any land or water;
2. The disassembly of any appliance/equipment for discharge, deposit, dumping or placing of its discarded component parts into or on any land or water; or
3. The disassembly of any appliance/equipment for reuse of its component parts.

Full charge: the amount of refrigerant required for normal operating characteristics and conditions of the appliance/equipment as determined by using specified methods in 40 CFR §82.152.

Continued on next page.

General information, continued

Definitions specific to this procedure *(continued)*

Major maintenance, service, or repair: any maintenance, service, or repair involving the removal of any or all of the following appliance/equipment components: compressor, condenser, evaporator, or auxiliary heat exchanger coil.

Minor maintenance, service, or repair: any maintenance, service, or repair not defined by "Major maintenance, service, or repair".

Motor vehicle air conditioner (MVAC): any appliance/equipment used to cool the driver's or passenger's compartment of a motor vehicle. Exception: appliance/equipment used on motor vehicles for refrigerated cargo or air conditioning systems on passenger buses using HCFC-22 refrigerant.

MVAC-like appliance/equipment: mechanical vapor compression, open-drive compressor appliances/equipment used to cool the driver or passenger's compartment of a non-road motor vehicle. This includes the air-conditioning equipment found on agricultural or construction vehicles. This definition is not intended to cover appliances/equipment using HCFC-22 refrigerant.

Opening an appliance/equipment: any service, maintenance, or repair on appliance/equipment that would release refrigerants from the appliance/equipment to the atmosphere unless the refrigerants were recovered previously from the appliance/equipment. Connecting and disconnecting hoses and gauges to and from the appliance/equipment to measure pressures within the appliance/equipment and to add refrigerant to or recover refrigerant from the appliance/equipment shall not be considered "opening."

Person: any individual or legal entity, including an individual, corporation, partnership, association, state, municipality, political subdivision of a state, Indian tribe, and any agency, department, or instrumentality of the United States, and any officer, agent, or employee thereof.

Reclaim refrigerant: to reprocess refrigerant to at least the purity specified in appendix A to 40 CFR §82, subpart F (based on ARI Standard 700-1993, Specifications for Fluorocarbon and Other Refrigerants) and to verify this purity using the analytical methodology prescribed in Appendix A of the regulation. In general, reclamation involves the use of processes or procedures available only at a reprocessing or manufacturing facility.

Recover refrigerant: to remove refrigerant in any condition from an appliance/equipment and storing it in an external container without necessarily testing or processing it in any way.

Continued on next page.

General information, continued

Definitions specific to this procedure *(continued)*

Recycle refrigerant: to extract refrigerant from an appliance/equipment and clean the refrigerant for reuse without meeting all of the requirements for reclamation. In general, recycled refrigerant is refrigerant that is cleaned using oil separation and single or multiple passes through devices, such as replaceable core filter-driers, which reduce moisture, acidity, and particulate matter. These procedures are usually implemented at the field job site.

Refrigerant: the fluid used for heat transfer in a refrigerating system; the refrigerant absorbs heat and transfers it at a higher temperature and a higher pressure, usually with a phase change. Refrigerants include but are not limited to, Class I and Class II ozone-depleting substances designated as such in 40 CFR §82, "Stratospheric Ozone Protection," Subpart A, "Production and Consumption Controls," Some examples of refrigerants are CFCs, HCFCs, HFCs, halons, carbon tetrachloride, methyl chloroform, methyl bromide, hydrobromofluorocarbons, and any other substance designated by EPA at a later date. Refrigerant blends (mixtures of two or more different chemical compounds) also constitute refrigerants.

Refrigerant circuit: the parts of an appliance/equipment normally connected to each other (or are separated only by internal valves) and are designed to contain refrigerant.

Technician: any person who performs maintenance, service, or repair that could be *reasonably expected to release refrigerants* from an appliance/equipment, except for MVACs, into the atmosphere. Technician also means any person who performs disposal of an appliance/equipment, except for small appliance/equipment, MVACs, and MVAC-like appliance/equipment that could be reasonably expected to release refrigerants from the appliance/equipment into the atmosphere. Technician includes, but is not limited to, installers, contractor employees, support services subcontractor personnel, and in some cases, owners.

References

The following documents are referenced in this procedure:

- RRES-MAQ-024, "Personnel Training"
- 40 CFR §82 Subpart A
- 40 CFR §82 Subpart F

Note

Actions specified within this procedure, unless preceded with "should" or "may," are to be considered mandatory guidance (i.e., "shall").

Who may perform work to this procedure?

Technician certification

Only **refrigeration technicians** properly certified by an EPA approved technician certification program are allowed to perform work on refrigeration appliance/equipment. Use the tables below to identify the appliance/equipment type and to determine what level of EPA certification is required to perform work on that type refrigeration appliance/equipment. The **support services subcontractor** ensures all of the technicians are appropriately certified along with the records of their certifications up-to-date, and submits copies of technician EPA certification certificates to RRES-MAQ.

Training to this procedure must be documented (see page 2) before **any** work on refrigeration appliance/equipment at LANL is performed.

Note: The technician certification required to perform work under 40 CFR §82 Subpart F is different than the technician certification required to perform work on motor vehicle air conditioners.

Appliance/ equipment type	Definition
Small Appliance/ equipment	Any of the following products that are fully manufactured, charged, and hermetically sealed in a factory with five pounds or less of refrigerant: refrigerators and freezers designed for home use, room air conditioners (including window air conditioners and packaged terminal air conditioners), packaged terminal heat pumps, dehumidifiers, under-the-counter ice makers, vending machines, and drinking water coolers.
High- or Very High-Pressure Appliance/ equipment	An appliance/equipment that uses a refrigerant with a boiling point between -50 and 10 degrees Centigrade at atmospheric pressure (29.9 inches of mercury). This definition includes but is not limited to an appliance/equipment using refrigerants CFC-12, HCFC-22, CFC-114, R-500, or R-502.
Low-Pressure Appliance/ equipment	An appliance/equipment that uses a refrigerant with a boiling point above 10 degrees Centigrade at atmospheric pressure (29.9 inches of mercury). This definition includes but is not limited to equipment utilizing refrigerants CFC-11, CFC-113, and HCFC-123.

Who may perform work to this procedure?, continued

Technician certification levels

Levels of certification required for technicians to maintain, service, or repair the following type of appliances/equipment are in the following table.

Level	Description:
Type I	Small appliances/equipment.
Type II	High or very high-pressure appliances/equipment, except small appliances/equipment and MVACs, or dispose of high or very high-pressure appliances/equipment, except small appliances/equipment and MVACs.
Type III	Low-pressure appliances/equipment or dispose of low-pressure appliances/equipment.
Type IV (Universal)	Low and high-pressure and small appliances equipment as described under Type I/II/III (above).

Apprentice workers

Apprentice workers are exempt from this requirement provided the apprentice is closely and continually supervised by a certified technician while performing any maintenance, service, repair, or disposal that could reasonably be expected to release refrigerant from the appliance/equipment into the environment. The supervising **certified refrigeration technician** is responsible for ensuring that the apprentice complies with this procedure and EPA requirements.

What equipment may be used to perform work?

Certified recovery and/or recycling equipment

All recovery and/or recycling equipment used must be certified by an EPA-approved testing organization. Certified recovery and/or recycling equipment manufactured after November 15, 1993 will have a manufacturer-installed label stating:

> THIS EQUIPMENT HAS BEEN CERTIFIED BY (*Approved Equipment Testing Organization*) TO MEET EPA's MINIMUM REQUIREMENTS FOR RECYCLING OR RECOVERY EQUIPMENT INTENDED FOR USE WITH (*Appropriate Category Of Appliance/Equipment).*

The design of certified recovery and/or recycling equipment might not be altered in any way that would affect the equipment's ability to meet EPA certification standards. All recovery and/or recycling equipment must be used in accordance with the manufacturer's directions, unless the directions conflict with EPA requirements.

If recovery and/or recycling equipment used to perform recovery and/or recycling work were **manufactured before November 15, 1993**, the **support services subcontractor** is responsible for having the equipment tested and certified to meet EPA performance standards.

The **support services subcontractor** is responsible for the proper maintenance of the recovery and/or recycling equipment and for ensuring that low loss fittings are placed on all recovery and/or recycling equipment.

Recovery and/or recycling equipment evacuation levels

Attaching evacuation chart

The support services subcontractor **RCC** attaches the most current EPA evacuation chart to each operable recovery and/or recycling unit.

Carry evacuation levels chart

All **refrigeration technicians** should wear the EPA Table 1 evacuation chart (see page 11) on his or her LANL badge. This enables the technician to have the evacuation levels available at all times.

Evacuation levels

Only certified recovery and/or recycling equipment can be used to perform maintenance on refrigeration appliance/equipment. Use the tables below to identify the appliance/equipment type and to determine what evacuation levels EPA requires. The tables do not address MVACS, and MVAC-like appliances/equipment.

Continued on next pages.

Recovery and/or recycling equipment evacuation levels, continued

Evacuation levels for high, very high, and low pressure appliances/ equipment

Use the following table (EPA's Table 1) for the evacuation of refrigerant from appliances/equipment unless specified otherwise in Tables 2 and 3.

EPA's Table 1

Using Recovery and Recycle Equipment (Inches of Hg Vacuum – relative to std atmospheric pressure of 29.9 inches Hg)

Type of Appliance/equipment:	Manufactured or Imported Before November 15, 1993	Manufactured or Imported On or After November 15, 1993	
		And Certified By An EPA Approved Testing Organization Using ARI 740-1993	And Certified By An EPA Approved Testing Organization Using A Method Other Than ARI 740-1993
HCFC-22 appliance/equipment, or isolated component of such appliance/equipment, normally containing less than 200 pounds of refrigerant	0	0	Follow Manufacturer's Instructions
HCFC-22 appliance/equipment, or isolated component of such appliance/equipment, normally containing 200 pounds or more of refrigerant	4	10	
Very high-pressure appliance/equipment, or isolated component of such	0	0	
Other high-pressure appliance/equipment, or isolated component of such appliance/equipment, normally containing less than 200 pounds of refrigerant	4	10	
Other high-pressure appliance/equipment, or isolated component of such appliance/equipment, normally containing 200 pounds or more of refrigerant	4	15	
Low-pressure appliances/equipment	25 mm Hg absolute	25 mm Hg absolute	

Recovery and/or recycling equipment evacuation levels, continued

Required evacuation levels if evacuation is not performed after completion of service and if repair is not major

Use Table 2 if evacuation of the appliance to the atmosphere is not to be performed after completion of the maintenance, service, or repair, and if the maintenance, service, or repair is not major.

Table 2

High- or Very High-Pressure Appliance/ equipment	Evacuate to a pressure no higher than 0 psig before opening.
Low-Pressure Appliance/ equipment	Pressurize to 0 psig before opening.

Required evacuation levels for oil changes

The appliance/equipment is to be evacuated or pressurized to a pressure no higher than 5 psig, before it is opened; or drain the oil into a system receiver to be evacuated or pressurized to a pressure no higher than 5 psig.

Required evacuation levels for small appliances/ equipment

Table 3 shows the required evacuation levels for small appliances/equipment.

Table 3

Using Recovery and Recycle Equipment			
Manufactured or Imported Before November 15, 1993	Manufactured or Imported On or After November 15, 1993		Or, you may
	When the Compressor Is Operating	When the Compressor Is Not Operating	
Recover 80% of the Refrigerant	Recover 90% of the Refrigerant	Recover 80% of the Refrigerant	Evacuate to 4 inches of Hg Vacuum

Accidental refrigerant releases

Overview

Records of accidental refrigerant releases to the atmosphere must be maintained to meet the requirements of 40 CFR §82, Subpart F. The intentional release of refrigerants into the environment, except for *de minimus* releases, is prohibited by federal law.

Accidental refrigerant release

Accidental refrigerant releases are refrigerant releases not associated with mechanical failures of the unit. Human-caused accidental damage to a refrigerant line, such as a forklift or nail penetration, would be considered accidental. Excessive vibration in a unit, which leads to line rupture, would not be an accidental release.

Prohibition on "intentional venting"

Since July 1, 1992, it has been against the law to intentionally vent refrigerants to the atmosphere while maintaining, servicing, repairing, or disposing of refrigeration equipment. Acceptable releases are:

- A *de minimus* quantity released in the course of making a good-faith attempt to recapture and recycle, or safely dispose of refrigerant. An example of a *de minimus* leak would be the quantity of refrigerant released while disconnecting a manifold gauge set.
- Refrigerants emitted during the normal course of operation such as purge unit operations.
- Mixtures of nitrogen and trace quantities of R-22 that are used as a holding charge or as a leak test gas, because in these cases they are not used as a refrigerant.

Maintaining, servicing, repairing, or disposing of appliances/equipment

Overview

EPA's service requirements must be observed in accordance with 40 CFR §82, Subpart F while maintaining, servicing, repairing, and disposing of refrigeration appliance/equipment.

Who can handle refrigerants?

Only properly certified **refrigeration technicians** and **authorized purchasers** may purchase refrigerants. Only properly certified **refrigeration technicians** may use refrigerants. The support services subcontractor provides the LANL Gas Plant with an accurate listing of technicians and authorized purchasers and up-dates the list when necessary.

Refrigerant inventory data

The support services subcontractor **RCC** provides all data necessary for RRES-MAQ to maintain an accurate and up-to-date inventory of refrigerants. This includes data on the refrigerants added to or removed from appliances/equipment (on the Refrigerant Support Services Subcontractor Service Form, Attachment 1, and the Refrigeration Appliance Salvage Disposal Log Form, Attachment 3) and refrigerant cylinder information (on the Refrigerant Cylinder Action Form, Attachment 4). It is recommended that the support service subcontractor perform occasional audits of their refrigerant inventory.

No venting of refrigerants

No person maintaining, servicing, repairing, or disposing of appliances/ equipment may knowingly vent, or otherwise release into the environment, refrigerant used in such equipment. *De minimus* releases associated with good faith attempts to recycle or recover refrigerants are not subject to this prohibition.

Leaks

Owners of equipment with charges of 50 pounds or greater are required to repair leaks in the equipment when those leaks together would result in the loss of more than a percentage of the equipment's charge over a year. For the commercial and industrial process refrigeration sectors, leaks must be repaired when the appliance leaks at a rate that would release 35 percent or more of the charge over a year. For all other sectors, including comfort cooling, leaks must be repaired when the appliance leaks at a rate that would release 15 percent or more of the charge over a year.

NOTE: In order to assist the owners in meeting these regulatory deadlines, and because the technicians are often in the best position to know the history or condition of equipment, it is **expected** that technicians will promptly report leaks, suspected leaks, or any other irregular system operation to the appropriate persons.

Maintaining, servicing, repairing, or disposing of appliances/equipment, continued

Leak rate calculation

To calculate the annual leak rate, the following formula is used:

$$Leak\ rate = \left[\frac{net\ \ refrigerant\ added}{normal\ \ full\ charge}\right] \times \left[\frac{365\ days}{days\ between\ services}\right]$$

$$Leak\ rate\ \% = Leak\ rate \times 100$$

Perform service work

When performing service work, the **technician** must keep in mind the following:

- Use the tables in the chapter *Recovery and/or recycling equipment evacuation levels* to determine required evacuation levels before opening or disposing of the appliance/equipment.
- Do not mix refrigerant oil with other oils. Refrigerant oil has RCRA waivers for the amount of ODS's contained in the oil. If oils are mixed, the RCRA exemptions will not apply.
- Ensure ALL new refrigerants are purchased from LANL's Gas Plant and that they have a LANL chemical tracking barcode number on the cylinder. In addition, all LANL recovery cylinders shall have a cylinder identification number. The support services subcontractor **RCC** is responsible for marking each recovery cylinder with a cylinder identification number.
- Use low-loss fittings and hoses during maintenance, service, repair and disposal functions.

Complete Service Form

In order to adhere to EPA's record keeping requirements, **refrigeration technicians** record all maintenance, service, repair, or disposal of <u>any</u> refrigeration appliance/ equipment that is performed by the support services subcontractor on LANL's Refrigerant Support Services Subcontractor Service Order Form (Attachment 1). Fill out this form <u>in its entirety</u> every time a service is performed and immediately forward to the support services subcontractor RCC (follow any applicable support services contractor processes for forwarding forms).

Complete ALL sections of the form. If a section is not applicable, enter "N/A" or any other notation to describe why the information was not provided.

Maintaining, servicing, repairing, or disposing of appliances/equipment, continued

Record data and submit form to RRES-MAQ

The support services subcontractor **RCC** enters the date the form was received from the technician and submits this form to RRES-MAQ within three working days after the work was completed by the technician. (Holidays, weekends, and LANL shutdowns are not counted against the three-day period).

Enter information

RRES-MAQ refrigeration records coordinator(s) enters the date received from the support services subcontractor RCC on the form, inputs the information into the tracking database, calculates the leak rate (if applicable), contacts facility representatives if necessary, and files the service form in the Laboratory's central filing system according to EPA and DOE requirements.

If leaks are found

If a leak is found on **ANY** appliance/equipment being serviced and cannot be repaired within a 24-hour period, the **refrigeration technician** notifies the support services subcontractor RCC who will notify RRES-MAQ within one working day (24-hour period) of discovering the leak(s).

The support services subcontractor **RCC** notifies RRES-MAQ (who will calculate the leak rate and inform facility management if the leak rate is within the acceptable limits for the appliance/equipment).

Documenting disposal of appliances/equipment

Disposal of appliances/ equipment

There are several ways to dispose of appliances/equipment at LANL. This chapter addresses the disposal of the following:

- Small appliances/equipment picked up from the LANL Salvage area.
- Small appliances/equipment disposed of at an on-site location (non-salvage).
- Appliances/equipment not designated as small appliances/equipment.

All refrigerant and/or oil must be removed and recovered before proper disposal can occur.

Appliances/ equipment picked up from salvage for recovery

To document the removal and recovery of refrigerant and/or oil, the **refrigeration technician** who performed the recovery process completes the Refrigeration Appliance Salvage/Disposal Log form (Attachment 3) in its entirety. Salvage personnel assign a unique identification number to each appliance/equipment once it has been designated for disposal. **Important**: Ensure the designated appliance identification number from salvage is entered on the form.

Appliances/ equipment recovered on-site

If the appliance/equipment is a small appliance, the **refrigeration technician** who performed the recovery completes the Refrigeration Appliance Salvage/Disposal Log form (Attachment 3) to document the removal and recovery of refrigerant and/or oil.

Appliances/ equipment not designated as small appliance/ equipment

If the appliance/equipment is not a small appliance, the **refrigeration technician** fills out the LANL's Refrigerant Support Services Subcontractor Service Form (Attachment 1) to document the recovery of refrigerant and/or oil.

Documenting disposal of appliances/equipment, continued

Completing disposal log form

For the Refrigeration Appliance Salvage/Disposal Log form, the **refrigeration technician** or **refrigeration technician's foreman** certifies that the recovery equipment was used properly and that the refrigerant was evacuated to EPA's specified levels per the EPA regulation by entering his or her signature, printed name, Z number, and date the log sheet is signed. Complete ALL columns of the form. If a field is not applicable, enter "N/A" or any other notation to describe why the information was not provided.

The support services subcontractor **RCC** submits a copy of the log to RRES-MAQ within 10 days after the end of every month.

Evacuation label

When appliance/equipment is evacuated of all refrigerant and/or oil prior to disposal, the **refrigeration technician** applies an evacuation label (Attachment 2) to the appliance/equipment for verification that all refrigerant and/or oil was removed. For compressors removed for metal recycling, also place an evacuation label on the compressor.

Note: Salvage personnel will not accept **any** appliances/equipment without the Refrigeration Appliance Salvage/Disposal Log and an evacuation label on the unit.

Tracking refrigerant cylinders

How tags get on cylinders

Gas plant personnel attach a tag to any new refrigerant cylinder that is purchased at the Laboratory through the Gas Plant. Before the cylinder is issued, **gas plant personnel** fill out the date of issue, cylinder ID number, and the vendor name on the tag. Remove the detachable stub and send to RRES-MAQ along with the invoice information for the cylinder(s). Include on the invoice the date and the name of the person who picked up the cylinders. Additionally, reference a LANL EPA-certified technician.

For refillable cylinders, the **RCC** places the tag on all refillable cylinders and fills out the date of issue, cylinder ID number, and the initial weight of the cylinder. The vendor name, release number, and the puncture information are not applicable for a refillable cylinder. Remove the detachable stub and send to RRES-MAQ.

Using Refrigerant Cylinder Action form

Refrigeration technicians use the Refrigerant Cylinder Action Form (Attachment 4) to track any of the following information:

- Any new cylinders to the inventory that did not come from the Gas plant
- The transfer of ownership of a cylinder
- The transfer of refrigerant from one cylinder to another
- The disposal of a cylinder
- The audit of refrigerant cylinders

Using cylinder tags

The use of the cylinder tags is optional, at the discretion of each designated zone area. If the cylinder tag is used, **refrigeration technicians** record on the cylinder tag (Attachment 5) the following information on refrigerant usage every time the cylinder is used:

- The weight of the cylinder upon receipt.
- The date refrigerant is used.
- The work order number.
- The technician's Z number.
- The start weight, end weight, and net weight (pounds and ounces) of the cylinder.

If the cylinder is ready for disposal (disposable cylinders only), the **refrigeration technician** enters the weight of the cylinder when empty, the date the cylinder was punctured, and the name of the person who punctured it.

Tracking refrigerant cylinders, continued

Completed cylinder tags

Once a tag is completed or full, it is given to the **RCC** who will send each completed tag to RRES-MAQ to track the history of refrigerant usage for that cylinder. For refillable cylinders, the **RCC** attaches a new tag.

Evaluation of percent completeness of service order form

Purpose

RRES-MAQ evaluates the percent completeness of the service order form submitted by the support services subcontractor. The Refrigerant Support Service Subcontractor Service Order forms (Attachment 1) are essential for maintaining and showing compliance under LANL's Title VI program. The forms provide written documentation that all maintenance, service, repair, and disposal activities are performed in accordance with all federal and state requirements and regulations. This evaluation is done in accordance with Performance Measures set forth by RRES-MAQ and FWO. The performance measure is designed to encourage and promote environmental compliance of the Title VI program through on-going assessing, measuring and trending to document progress in this area.

Evaluation form

In order to evaluate the completeness of the service order form, RRES-MAQ developed a quality assurance form (Attachment 6). The evaluation is divided into eight sections with each section comprising 12.5% of the total 100%.

If all applicable criterions under each section are completed correctly, the "yes" box of the checklist will be checked, otherwise the "no" box will be checked. The percentage of completeness is calculated by dividing the number of "yes" boxes by eight and multiplying by 100.

Completing the evaluation form

The **Refrigeration Records Coordinator** provides the percentage of completeness on the form along with the net refrigerant added information and annual leak rate calculation (if applicable). The **Refrigeration Records Coordinator** fills in his/her signature, printed name, Z number, and date the form is completed.

The **Refrigeration Records Coordinator** provides a copy of the evaluation form to the Support Services Subcontractor RCC along with the appropriate service order form for his/her records.

Records resulting from this procedure

Records submitted by support services subcontractor to RRES-MAQ

The following records generated as a result of this procedure are to be submitted by the support services subcontractor RCC **within 10 working days** (unless indicated otherwise below) of work completion to RRES-MAQ:

- Refrigerant Support Services Subcontractor Service Order Form (Attachment 1) (**submit within 3 days** of work completion)
- Refrigerant Cylinder Action Form (Attachment 4) (**submit within 3 days** of work completion)
- Refrigeration Appliance Salvage/Disposal Logs (Attachment 3) (**submit copy monthly within 10 days after end of month**)
- Training Documentation (RRES-MAQ-024)
- Technician Certification Certificates (issued from EPA approved organization)
- Technician and Authorized Refrigerant Purchaser Letter to Gas Plant (Support Services Subcontractor memo)

Records entered into database by support services subcontractor

The following records generated as a result of this procedure are to be **entered** into the RCM™ database by the support services subcontractor RCC **within 10 working days** when completed, modified or added:

- Technician Certification Information (RCM™ entry)
- Recovery & Recycling Equipment Information & Proof of Certification (RCM™ entry; maintain manufacturer information for life of equipment)
- Recovery & Recycling Equipment Maintenance Records, when required by manufacturer (RCM™ entry)

Other records

The following records generated as a result of this procedure are to be attached to refrigeration units during equipment disposal (off-site or on-site disposal):

- Evacuation label

Summary of records

The table below summarizes the required records from this procedure:

Record	By	To	When
Refrigerant Support Services Subcontractor Service Order Form (Attachment 1)	Support services subcontractor RCC	RRES-MAQ	Within 3 working days of completion or within 24-hours if leak report.

Records resulting from this procedure, continued

Record	By	To	When
Refrigerant Cylinder Action Form (Attachment 4)	Support services subcontractor RCC	RRES-MAQ	Within 3 working days of completion
Refrigeration Appliance Salvage/Disposal Logs (Attachment 3)	Support services subcontractor RCC	RRES-MAQ	Every month within 10 working days after end of month
Training documentation pursuant to RRES-MAQ-024	Support services subcontractor RCC	RRES-MAQ	Within 10 working days of completion
Technician Certification Certificates (issued from EPA approved organization)	Support services subcontractor RCC	RRES-MAQ	Within 10 working days of completion
Technician and Authorized Refrigerant Purchaser Letter to Gas Plant (Support Services Subcontractor memo)	Support services subcontractor RCC	RRES-MAQ	Within 10 working days of completion
Technician Certification Information (RCM™ entry)	Support services subcontractor RCC	RCM™ database	Within 10 working days of completion
Recovery and recycling equipment information and proof of certification	Support services subcontractor RCC	RCM™ database; maintain info. for life of equipment	Within 10 working days of purchase.
Recovery and recycling equipment maintenance records, when required by manufacturer	Support services subcontractor RCC	RCM™ database	Within 10 working days of completion
Evacuation label	Technicians who evacuate equipment	On equipment	Whenever equipment is evacuated for disposal

Meteorology and Air Quality Group, MAQ

Refrigerant Support Services Subcontractor Service Order Form

Page 1 of 1 — This form is from procedure RRES-MAQ-312

Section 1.0 Work Order Information

Work Order #: _____ **Task #:** _____

Begin Work Date: ___/___/____ **Date work completed:** ___/___/___

Section 2.0 Facility Information

Division: _____ **FMU:** _____

TA: _____ **Bldg.:** _____ **Room:** _____

Facility Contact:

Section 3.0 Appliance/Equipment Information

Appliance/equipment ID: _____ **Circuit 1** ☐ **Circuit 2** ☐ **Circuit 3** ☐ **Circuit 4** ☐

Manufacturer: _____

Model No.: _____ **Serial No.:** _____

Refrigerant Type: _____ ☐ **≥50 lbs** ☐ **>5-49 lbs** ☐ **≤5 lbs** **Charge:** _____**lbs** _____**oz**

Section 4.0 Service Information

Description of Service: Check appropriate box below. Attach description of work from work package.

☐ Confirm Charge ☐ New installation ☐ Upgrades ☐ Minor Maintenance ☐ Major Maintenance ☐ Preventive Maintenance

☐ Refrigerant/Oil removed for disposal (**evacuation label applied**) ☐ Refrigerant conversion to _____refrigerant

☐ Accidental Release (**Estimated Amount Released:** _____ **lbs** _____ **oz)** ☐ **LEAK REPORT**

Description: ☐ Attached description of work from work package OR ☐ describe below ☐ Attached Form 312 to work package

Section 5.0 Leak Information

Leaks

☐ Leak Tested by method: Elec./Soap Bubbles/Visual Other: _____
(circle one)

☐ Leak Found Date: _____/_____/_____

Scheduled Date for Repair: _____/____/_____

☐ Leak Repaired Date: ____/____/_____

Days to Repair Leak: _____

☐ Initial Verification Test Date: ___/____/____ Method:_____

☐ Follow-up Test Date: ____/____/_____ Method:_____

☐ Trace Gas Used Type: _____ Cylinder ID: _____ Quantity: _____lbs _____oz

Leak Notes:

☐ Attach leak notes in description of work from work package, if NOT, describe below:

Oil Removed _____ gallons Type of Oil: _____ Put into accumulation drum: _____

Section 6.0 Refrigerant Tracking Information

Cylinder ID/ACIS Barcode Number	Refr. Type	Amount Recovered*	Amount Added: Recovered Amount Added	Amount Added: New Amount Added
		_____lbs _____oz	_____lbs _____oz	_____lbs _____oz
		_____lbs _____oz	_____lbs _____oz	_____lbs _____oz
		_____lbs _____oz	_____lbs _____oz	_____lbs _____oz
		_____lbs _____oz	_____lbs _____oz	_____lbs _____oz
			Total: _____**lb** _____**oz**	**Total:** _____**lb** ___**oz**

***Recovery Unit Information**

Recovery Unit ID: _____ **Vacuum Level:** _____ **inches/microns (circle one) Time Used:** _____**hr** _____**min** **Filter type:** _____

Section 7.0 Technician Certification

I hereby certify that maintenance, service, repair, and/or disposal was performed on the above listed refrigeration appliance/equipment in accordance with the required practices set forth in 40 CFR §82, Subpart F. For disposal, I certify that the refrigerant has been evacuated to the levels required in 40 CFR §82, Subpart F.

_____ Certified Technician's Signature | _____ Printed Name | _____ Z Number | _____/_____/_____ Date

Date Received by Support Services Subcontractor RCC | ***Date Received by RRES-MAQ:***

Forward completed form to RRES-MAQ Meteorology and Air Quality Group

EVACUATION LABEL

REFRIGERANT/OIL REMOVED

I hereby certify that refrigerant and oil has been removed from this unit in compliance with Section 608 of the Clean Air Act.

Date Removed:

Technician Signature:

Z Number:

Company:

LOS ALAMOS NATIONAL LABORATORY

Los Alamos, NM 87545 ESH-17

Meteorology and Air Quality Group, MAQ

REFRIGERATION APPLIANCE SALVAGE/DISPOSAL LOG

This form is from procedure RRES-MAQ-312

Date of Disposal	Unit ID or Model Number	Serial Number	Salvage ID Number	Appliance Description	Refrig Type	Refrigerant Extracted lbs	Refrigerant Extracted oz	Recovery cylinder ID used	Recovery/ recycle Equip ID Used	Technician Information Z no.	Technician Information Initials	Date picked up by salvage contractor

I hereby certify that the recovery equipment was used properly and that refrigerant was evacuated to EPA's specified levels as set forth in 40 CFR 82, Subpart F.

Signature *Certified Refrigerant Technician* _____ Print name _____ Date _____

Forward completed form to RRES-MAQ Meteorology and Air Quality Group.

Meteorology and Air Quality Group, MAQ

REFRIGERANT CYLINDER ACTION FORM

This form is from procedure RRES-MAQ-312

Use this form for ONE of the six actions in the three sections below.

☐ **New to inventory** ☐ **Disposal** ☐ **Audit** ☐ **Other:** _____ *(describe in Notes)*

Cylinder ID:			Refrigerant type:	
Cylinder currently assigned to:	☐ Zone: Zone number: _____ Division: _____ ☐ Off-site: Name: _____			
Refrigerant condition:	☐ New ☐ Recycled ☐ Reclaimed ☐ Recovered ☐ Contaminated			
Cylinder size:	lb			
Tare weight:	lb	oz	Cylinder type:	☐ Refillable
Total weight:	lb	oz		☐ Returnable
Current quantity:	lb	oz		☐ Disposable
Purchased date: *(if known)*				
Inspected date on cylinder:		Next Inspection Date:		

☐ **Transfer of Cylinder Ownership**

Transferring ownership to:	☐ Zone: Zone number: _____ Division: _____ ☐ Off-site: Name: _____			
Cylinder ID(s) being transferred:	1	2.	3.	4.
	5.	6.	7.	8.
	9.	10.	11.	12.

☐ **Transfer of Refrigerant to Recovery Cylinder**

From cylinder ID:	1.		2.		3.		4.	
Amount transferred:	lb	oz	lb	oz	lb	oz	lb	oz
From cylinder ID:	5.		6.		7.		8.	
Amount transferred:	lb	oz	lb	oz	lb	oz	lb	oz
To recovery cylinder ID:								

Date of action: ____/ _____/ _____

Notes:

_____ _____ _____ ____/____/_____

Signature Printed Name Z Number Date

Forward completed form to RRES-MAQ Air Quality Group.

CYLINDER ID TAG SAMPLE

Los Alamos National Laboratory
Refrigeration Management Program

Cylinder ID Number: _____

Vendor Name: _____ Release #: _____

Weight out (lbs/oz): _____ Weight in (lbs/oz): _____

Date Cylinder Punctured: _____

Punctured by: _____

Send completed tag to ESH-17, MS J978

Net Weight (lbs/oz)												
End Weight (lbs/oz)												Total Used: .
Start Weight (lbs/oz)												
Technician's Z number												
Work Order #												
Date												

(Detach this stub upon issue. Send to ESH-17, MS J978

Los Alamos National Laboratory
Refrigeration Management Program

Date of Issue: _____

Cylinder ID Number: _____

Vendor Name: _____ Release #: _____

SAMPLE

Meteorology and Air Quality Group, MAQ

SUPPORT SERVICES SUBCONTRACTOR SERVICE ORDER EVALUATION FORM

This form is from procedure RRES-MAQ-312

Work Order Number:	Task Number:	Date Received by RRES-MAQ:
Technician on Work Order:	Received from:	Zone:

Checklist		Section	Detailed Check list
1. ☐ Yes	☐ No	Form received within 3 working days? (12.5%)	Under detailed check list: Box checked = **YES**
Comments:			
2. ☐ Yes	☐ No	Section 1. Work Order Information (12.5%)	☐ Work Order No. ☐ Task Number ☐ Begin W[illegible]ate ☐ Date Work Completed
Comments:			
3. ☐ Yes	☐ No	Section 2. Facility Information (12.5%)	☐ Si[illegible] ☐ [illegible]/B[illegible]Room ☐ Ty[illegible] ☐ C[illegible]
Comments:			
4. ☐ Yes	☐ No	Sectio[illegible] In[illegible]io[illegible]5%)	☐ [illegible] ☐ [illegible]ge Information ☐ M[illegible]eria[illegible] ☐ [illegible]efrigerant Type
Comments:			
5. ☐ Yes	☐ No	[illegible]or[illegible]rv[illegible]or[illegible]n ([illegible])	☐ Appropriate Box Checked ☐ Service Description Provided
Comments:			
6. ☐ Yes	☐ No	Section 5.0 Leak Information (12.5%)	☐ Leak Tested ***When required:*** ☐ Leak found ☐ Leak repaired ☐ If leak not fixed, RRES-MAQ notified within 1 day of leak discovered? ☐ Initial Verification test ☐ Follow-up Test ☐ Leak Notes Provided
Comments:			
7. ☐ Yes	☐ No	Section 6.0 Refrigerant Tracking Information (12.5%)	☐ Recovery Cylinder/ACIS Number Provided ☐ Refrigerant Type Provided ☐ If Recovered, Recovery Unit Provided
Comments:			
8. ☐ Yes	☐ No	Section 7.0 Technician Certification (12.5%)	☐ Signature/Z number/Date Provided

Service Record Percent Complete: _____

Net Refrigerant Added = _____lb _____oz; **Annual Leak rate =** _____%

Service record information has been entered into the Refrigerant Compliance Manager™ database. When applicable, the annual equipment leak rate has been calculated.

_____	_____	_____	_____/_____/_____
Refrigeration Records Coordinator Signature	Print name	Z-Number	Date Completed

Meteorology and Air Quality Group, MAQ

REFRIGERATION APPLIANCE SALVAGE/DISPOSAL LOG

This form is from procedure RRES-MAQ-312

Date of Disposal	Unit ID or Model Number	Serial Number	Salvage ID Number	Appliance Description	Refrig Type	Refrigerant Extracted lbs	Refrigerant Extracted oz	Recovery cylinder ID used	Recovery/ recycle Equip ID Used	Technician Information Z no.	Technician Information Initials	Date picked up by salvage contractor

I hereby certify that the recovery equipment was used properly and that refrigerant was evacuated to EPA's specified levels as set forth in 40 CFR 82, Subpart F.

Signature *Certified Refrigerant Technician* Print name Date

Forward completed form to RRES-MAQ Meteorology and Air Quality Group.

Meteorology and Air Quality Group, MAQ

Refrigerant Support Services Subcontractor Service Order Form

 This form is from procedure RRES-MAQ-312

Section 1.0 Work Order Information

Work Order #: _____ **Task #:** _____

Begin Work Date: ___/___/____ **Date work completed:** ___/___/___

Section 2.0 Facility Information

Division: _____ **FMU:** _____

TA: _____ **Bldg.:** _____ **Room:** _____

Facility Contact:

Section 3.0 Appliance/Equipment Information

Appliance/equipment ID: _____ **Circuit 1** ☐ **Circuit 2** ☐ **Circuit 3** ☐ **Circuit 4** ☐

Manufacturer: _____

Model No.: _____ **Serial No.:** _____

Refrigerant Type: _____ ☐ **≥50 lbs** ☐ **>5-49 lbs** ☐ **≤5 lbs** **Charge:** _____**lbs** _____**oz**

Section 4.0 Service Information

Description of Service: Check appropriate box below. Attach description of work from work package.

☐ Confirm Charge ☐ New installation ☐ Upgrades ☐ Minor Maintenance ☐ Major Maintenance ☐ Preventive Maintenance

☐ Refrigerant/Oil removed for disposal (**evacuation label applied**) ☐ Refrigerant conversion to _____refrigerant

☐ Accidental Release (**Estimated Amount Released:** _____ **lbs** _____**oz**) ☐ **LEAK REPORT**

Description: ☐ Attached description of work from work package **OR** ☐ describe below ☐ Attached Form 312 to work package

Section 5.0 Leak Information

Leaks

☐ Leak Tested by method: Elec./Soap Bubbles/Visual Other: _____
(circle one)

☐ Leak Found Date: _____/_____/_____

Scheduled Date for Repair: _____/____/_____

☐ Leak Repaired Date: ____/____/_____

Days to Repair Leak: _____

☐ Initial Verification Test Date: ____/____/____ Method: _____

☐ Follow-up Test Date: ____/____/_____ Method: _____

☐ Trace Gas Used Type: _____ Cylinder ID: _____ Quantity: _____lbs _____oz

Leak Notes:

☐ Attach leak notes in description of work from work package, if NOT, describe below:

Oil Removed: _____gallons Type of Oil: _____ Put into accumulation drum: _____

Section 6.0 Refrigerant Tracking Information

Cylinder ID/ACIS Barcode Number	Refr. Type	Amount Recovered*	Amount Added: Recovered Amount Added	Amount Added: New Amount Added
		lbs oz	lbs oz	lbs oz
		lbs oz	lbs oz	lbs oz
		lbs oz	lbs oz	lbs oz
		lbs oz	lbs oz	lbs oz
		lbs oz	lbs oz	lbs oz
			Total: lb oz	**Total:** lb oz

***Recovery Unit Information**

Recovery Unit ID: _____ **Vacuum Level:** _____**inches/microns (circle one) Time Used:** _____**hr** _____**min Filter type:** _____

Section 7.0 Technician Certification

I hereby certify that maintenance, service, repair, and/or disposal was performed on the above listed refrigeration appliance/equipment in accordance with the required practices set forth in 40 CFR §82, Subpart F. For disposal, I certify that the refrigerant has been evacuated to the levels required in 40 CFR §82, Subpart F.

Certified Technician's Signature	Printed Name	Z Number	Date
_____	_____	_____	_____/_____/_____

Date Received by Support Services Subcontractor RCC:	***Date Received by RRES-MAQ:***

Forward completed form to RRES-MAQ Meteorology and Air Quality Group.

Meteorology and Air Quality Group, MAQ

REFRIGERANT CYLINDER ACTION FORM

 This form is from procedure RRES-MAQ-312

Use this form for ONE of the six actions in the three sections below.

☐ **New to inventory** ☐ **Disposal** ☐ **Audit** ☐ **Other:** _____ *(describe in Notes)*

Cylinder ID:			Refrigerant type:	
Cylinder currently assigned to:	☐ Zone: Zone number: _____ Division: _____			
	☐ Off-site: Name: _____			
Refrigerant condition:	☐ New ☐ Recycled ☐ Reclaimed ☐ Recovered ☐ Contaminated			
Cylinder size:	lb			
Tare weight:	lb	oz	Cylinder type:	☐ Refillable
Total weight:	lb	oz		☐ Returnable
Current quantity:	lb	oz		☐ Disposable
Purchased date: *(if known)*				
Inspected date on cylinder:		Next Inspection Date:		

☐ **Transfer of Cylinder Ownership**

Transferring ownership to:	☐ Zone: Zone number: _____ Division: _____			
	☐ Off-site: Name: _____			
Cylinder ID(s) being transferred:	1	2.	3.	4.
	5.	6.	7.	8.
	9.	10.	11.	12.

☐ **Transfer of Refrigerant to Recovery Cylinder**

From cylinder ID:	1.		2.		3.		4.	
Amount transferred:	lb	oz	lb	oz	lb	oz	lb	oz
From cylinder ID:	5.		6.		7.		8.	
Amount transferred:	lb	oz	lb	oz	lb	oz	lb	oz
To recovery cylinder ID:								

Date of action: ____/ _____/ _____

Notes:

_____ _____ _____ ____/____/_____

Signature Printed Name Z Number Date

Forward completed form to RRES-MAQ Meteorology and Air Quality Group.

Meteorology and Air Quality Group, MAQ

SUPPORT SERVICES SUBCONTRACTOR SERVICE ORDER FORM EVALUATION FORM

This form is from procedure RRES-MAQ-312

Work Order Number:	Task Number:	Date Received by RRES-MAQ:
Technician on Work Order:	Received from:	Zone:

Checklist		Section	Detailed Check list
1. ☐ Yes	☐ No	Form received within 3 working days? (12.5%)	Under detailed check list: Box checked = **YES**
Comments:			
2. ☐ Yes	☐ No	Section 1. Work Order Information (12.5%)	☐ Work Order No. ☐ Task Number ☐ Begin Work Date ☐ Date Work Completed
Comments:			
3. ☐ Yes	☐ No	Section 2. Facility Information (12.5%)	☐ Division/FMU ☐ TA/Bldg./Room ☐ Facility Contact
Comments:			
4. ☐ Yes	☐ No	Section 3. Appliance Information (12.5%)	☐ Appliance ID ☐ Charge Information ☐ Mfr./Model/Serial No. ☐ Refrigerant Type
Comments:			
5. ☐ Yes	☐ No	Section 4. Service Information (12.5%)	☐ Appropriate Box Checked ☐ Service Description Provided
Comments:			
6. ☐ Yes	☐ No	Section 5.0 Leak Information (12.5%)	☐ Leak Tested ***When required:*** ☐ Leak found ☐ Leak repaired ☐ If leak not fixed, RRES-MAQ notified within 1 day of leak discovered? ☐ Initial Verification test ☐ Follow-up Test ☐ Leak Notes Provided
Comments:			
7. ☐ Yes	☐ No	Section 6.0 Refrigerant Tracking Information (12.5%)	☐ Recovery Cylinder/ACIS Number Provided ☐ Refrigerant Type Provided ☐ If Recovered, Recovery Unit Provided
Comments:			
8. ☐ Yes	☐ No	Section 7.0 Technician Certification (12.5%)	☐ Signature/Z number/Date Provided

Service Record Percent Complete: _____

Net Refrigerant Added = _____ lb _____ oz; **Annual Leak rate =** _____ %

Service record information has been entered into the Refrigerant Compliance Manager™ database. When applicable, the annual equipment leak rate has been calculated.

_____	_____	_____	_____/_____/_____
Refrigeration Records Coordinator Signature	Print name	Z-Number	Date Completed